

## A Systematic Study on the Ophiuroidea in Korea I. Species from the Sea of Japan and the Korea Strait

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### 한국산 사미류의 계통분류학적 연구 I. 동해와 남해 연안에 사는 종

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### 서 론

한국산 사미류의 계통분류학적 연구를 하기 위하여 1969년 4월 부터 1991년 10월까지 동해와 남해의 연안과 여러 도서지방의 총 92개 지역에서 채집하여 보관중이던 표본을 동정·분류하였다. 그 결과 2목 4아목 8과 18속 41종의 사미류가 밝혀졌고 이들중 *Ophiactis brachygenys*, *Ophiactis modesta*, *Ophiopholis brachyactis*, *Amphiodia cyclaspis*, *Amphipholis kochii*, *Ophionereis eurybrachioplax* 6종은 한국미기록종이다. 동정된 41종의 해역별 분포를 보면 대한해협에 24종 (58.5%)으로 가장 많았고 동해에만 분포하는 종은 9종 (22.0%), 대한해협과 동해에 공통으로 분포하는 종은 8종 (19.5%)이었다. *Ophiothrix exigua*가 대한해협을 포함하여 가장 많은지역 (44지역)에서 채집되었고, 동해에서는 *Ophiura sarsii*가 가장 흔한 종이였다. 온대종이 18종으로 가장 많았으며 열대종이 15종, 냉대종이 7종이었고 1종의 범세계종이 분포하고 있었다.

Key words: systematics, Ophiuroidea, Sea of Japan, Korea Strait.

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This work was supported by 1990-1991 year grant from Korean Science and Engineering Foundation.

## INTRODUCTION

The present study is a continuous work for the ophiuroid fauna in Korea. With regard to ophiuroids distributed in the Sea of Japan and the Korea Strait, H.L. Clark (1911) reported in the vicinity of Youngil Bay in the Sea of Japan and Matsumoto (1917) classified ophiuroids collected from Chindo in the Korea Strait. Since then only 37 species have been recorded by Rho and Kim (1966), Rho (1979), Yi (1983), Rho and Shin (1983, 1987), Shin and Rho (1986) and Shin (1987).

Still further researches are needed for the better understanding of Korean ophiuroid fauna, particularly of the ophiuroids distributed in the Sea of Japan and the Korea Strait. Due to the influences of a warm branch current of Kuroshio Current and a cold branch current of Liman Current, the Sea of Japan and the Korea Strait are noticeably abundant in ophiuroid species. Thus the systematic and distributional study of ophiuroids collected from the Sea of Japan and the Korea Strait in Korea has been performed by the present author in detail.

## MATERIALS AND METHODS

The materials used were collected from 92 localities in the Sea of Japan (36 localities) and the Korea Strait (56 localities) during the period from April, 1969 to October, 1991 (Fig. 1). The specimens were collected by author and others using pincette and shovel in the intertidal zone and by SCUBA diving and fishing net from the subtidal zone. They were fixed and preserved in about 75% methyl alcohol and were identified on the basis of their morphological characteristics. The classification was based on the systems of Matsumoto (1917) and Mortensen (1927). For those species newly reported in the present work, a brief description and the plates are introduced. The geographical distribution in the Sea of Japan and the Korea Strait has been reviewed on the basis of numbers of species and of specimens collected. The distribution pattern according to ocean and water forms has been also reviewed by considering the distribution areas reported in the literature in relation to ophiuroid species.

## RESULTS AND DISCUSSION

The ophiuroids identified turned out to be 41 species belonging to 18 genera, 8 families, 4 suborders and 2 orders. Of which 6 species (asterisk\*) are newly reported in Korean ophiuroid fauna.

### Systematic list

Phylum Echinodermata Klein, 1734	극피동물 문
Class Stelleroidea Lamarck, 1816	성형 강
Subclass Ophiuroidea Gray, 1840	사미 아강
Order Phrynophiurida Matsumoto, 1915	혁사미 목
Family Gorgonocephalidae Ljungman, 1867	삼천발이 과
Genus <i>Gorgonocephalus</i> Lyman, 1865	삼천발이 속

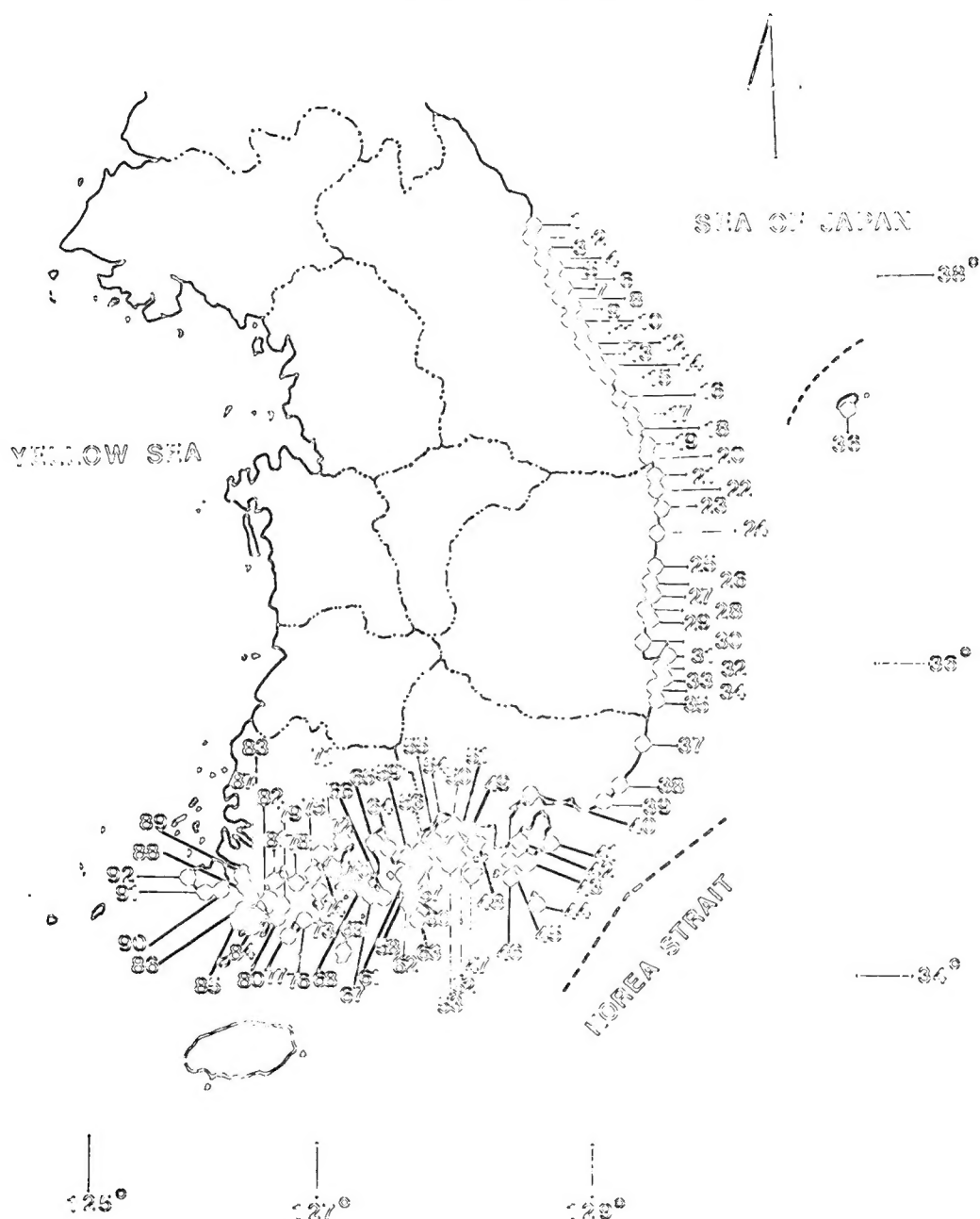


Fig. 1. A map showing the localities where the materials were collected.

I. Kangwon-do(강원도)

- 1, Taejin(대진); 2, Kōjin(거진); 3, Panam(반암); 4, Kajin(가진); 5, Oho(오호); 6, Ayajin(아야진); 7, Sokch'o(속초); 8, Taep'o(대포); 9, Susan(수산); 10, Kisamun(기사문); 11, Namae(남애); 12, Chumunjin(주문진); 13, Sachōn(사천); 14, Kangmun(강문); 15, Okkye(옥계); 16, Mukho(목호); 17, Samchōk(삼척); 18, Kündōk(근덕); 19, Changho(장호); 20, Imwon(임원).

## II. Kyongsangbuk-do(경상북도)

21, Chukpyŏn(죽변); 22, Hyunrae(현래); 23, Osan(오산); 24, Hup'o(후포); 25, Ch'uksan(축산); 26, Ch'ahyu(차휴); 27, Ch'angp'o(창포); 28, Kanggu(강구); 29, Pangŏ(방어); 30, P'ohang(포항); 31, Kuryongp'o(구룡포); 32, Hajŏng(하정); 33, Mop'o(모포); 34, Yangp'o(양포); 35, Kamp'o(감포); 36, Todong(도동).

## III. Kyongsangnam-do(경상남도)

37, Pangŏjin(방어진); 38, Kijang(기장); 39, Mip'o(미포); 40, Chinhae(진해); 41, Changsŏngp'o(창승포); 42, Ch'ungmu(충무); 43, Pijindo(비진도); 44, Hongdo(홍도); 45, Indaedo(인대도); 46, Chŏngsa(청사); 47, Yokjido(육지도); 48, Sinsudo(신수도); 49, Samchŏnp'o(삼천포); 50, Nŭkdo(늑도); 51, Mulkŏn(물전); 52, Mijo(미조); 53, Sangju(상주); 54, Sŏsang(서상); 55, Dangjo(당저).

## IV. Chollanam-do(전라남도)

56, Wonp'o(원포); 57, Wolrae(월래); 58, Pangjukp'o(방죽포); 59, Kunnae(군내); 60, Kŭmodo(금오도); 61, Kyedong(계동); 62, Yŏndo(연도); 63, Sorido(소리도); 64, Gamagyang(가막양); 65, Ganolim Bay(가노림만); 66, Narodo(나로도); 67, Sinkŭm(신금); 68, Naepal(내팔); 69, Kŏmundo(거문도); 70, P'ungnab(풍납); 71, Nokdong(녹동); 72, Pibong(비봉); 73, Kwanmog(관목); 74, Kagyo(가교); 75, Maryang(마량); 76, Sinhŭng(신흥); 77, Do'chŏng(도청); 78, Mandŏk(만덕); 79, Kunnae(군내); 80, Mangnam(망남); 81, Wando(완도); 82, Wondong(원동); 83, Pija(비자); 84, Yesong(예송); 85, Sŏnchang(선창); 86, Dŭngsan(등산); 87, Tongho(통호); 88, Ōran(어란); 89, Kusŏng(구성); 90, Chukrim(죽림); 91, Gulp'o(굴포); 92, Kahag(가학).

1. *Gorgonocephalus eucnemis japonicus* Döderlein, 1902      삼천발이

2. *Gorgonocephalus tuberosus* Döderlein, 1911      흑삼천발이

Genus *Astrodermum* Döderlein, 1911      나무거미불가사리 속

3. *Astrodermum sagaminum* (Döderlein, 1902)      나무거미불가사리

Genus *Astrocladus* Verrill, 1899      가지거미불가사리 속

4. *Astrocladus coniferus coniferus* Döderlein, 1902      흑가지거미불가사리

5. *Astrocladus coniferus pardalis* (Döderlein, 1902)      표범흑가지거미불가사리

6. *Astrocladus coniferus dofleini* (Döderlein, 1910)      도플라인흑가지거미불가사리

7. *Astrocladus annulatus* (Matsumoto, 1912)      띠가지거미불가사리

Order Myophiurida Matsumoto, 1915      폐사미 목

Suborder Laemophiurina Matsumoto, 1915      후사미 아목

Family Ophiacanthidae (Perrier, 1891)      침거미불가사리 과

Genus *Ophiacantha* Müller et Troschel, 1842      침거미불가사리 속

8. *Ophiacantha omoplata* H.L. Clark, 1911      넓적침거미불가사리

Suborder Gnathophiurina Matsumoto, 1915      악사미 아목  
 Family Ophiactidae Matsumoto, 1915      뱀이거미불가사리 과  
 Genus *Ophiactis* Lütken, 1856      뱀이거미불가사리 속

- °9. *Ophiactis brachygenys* H.L. Clark, 1911      짧은뱀이거미불가사리 (신칭)
- 10. *Ophiactis profundus* Lütken et Mortensen, 1899      깊은뱀이거미불가사리
- 11. *Ophiactis affinis* Duncan, 1879      유사뱀이거미불가사리
- 12. *Ophiactis macrolepidota* Marktanner-Turneretscher, 1887      예쁜뱀이거미불가사리
- °13. *Ophiactis modesta* Brock, 1888      잔잔뱀이거미불가사리 (신칭)

Genus *Ophiopholis* Müller et Troschel, 1842      뿔거미불가사리 속

- 14. *Ophiopholis mirabilis* (Duncan, 1879)      뿔거미불가사리
- 15. *Ophiopholis aculeata* (Linné, 1767)      뿔족뿔거미불가사리
- 16. *Ophiopholis japonica* Lyman, 1879      왜뿔거미불가사리
- °17. *Ophiopholis brachyactis* H.L. Clark, 1911      완뿔거미불가사리 (신칭)

Family Amphiuridae Ljungman, 1867      양편거미불가사리 과  
 Genus *Amphiodia* Verrill, 1899      양편거미불가사리 속

- 18. *Amphiodia craterodonta* H.L. Clark, 1911      둥글거미불가사리
- °19. *Amphiodia cyclaspis* D'yakonov, 1935      양편거미불가사리 (신칭)

Genus *Amphipholis* Ljungman, 1866      양비늘거미불가사리 속

- 20. *Amphipholis squamata* (Delle Chiaje, 1828)      양비늘거미불가사리
- 21. *Amphipholis sobrina* Matsumoto, 1917      납작양비늘거미불가사리
- 22. *Amphipholis tetracantha* Matsumoto, 1941      네가시양비늘거미불가사리
- °23. *Amphipholis kochii* Lütken, 1872      코치양비늘거미불가사리 (신칭)

Genus *Amphiplus* Verrill, 1899      양거미불가사리 속

- 24. *Amphiplus tricoides* Matsumoto, 1917      덧니거미불가사리
- 25. *Amphiplus japonicus parvus* Matsumoto, 1941      순양거미불가사리

Genus *Amphiura* Forbes, 1842      턱뱀거미불가사리 속

- 26. *Amphiura koreae* Duncan, 1879      턱뱀거미불가사리
- 27. *Amphiura aestuarii* Matsumoto, 1915      아기팔거미불가사리
- 28. *Amphiura sinicola* (Matsumoto, 1941)      긴팔거미불가사리

- Family Ophiotrichidae Ljungman, 1867      가시거미불가사리 과  
Genus *Ophiotrix* Müller et Troschel, 1840      가시거미불가사리 속
29. *Ophiotrix koreana* Duncan, 1879      고려가시거미불가사리  
30. *Ophiotrix exigua* (Lyman, 1874)      짧은가시거미불가사리
- Genus *Ophiogymma* Ljungman, 1866      뱀가시불가사리 속
31. *Ophiogymma fulgens* (Koehler, 1905)      큰뱀가시거미불가사리
- Suborder Chilophiurina Matsumoto, 1915      순사미 목  
Family Ophiodermatidae Ljungman, 1867      가죽거미불가사리 과  
Genus *Ophiarachnella* Ljungman, 1872      뱀거미불가사리 속
32. *Ophiarachnella gorgonia* Müller et Troschel, 1842      뱀거미불가사리
- Family Ophionereididae Lütken, 1859      딱지거미불가사리 과  
Genus *Ophionereis* Lütken, 1858      딱지거미불가사리 속
33. *Ophionereis dubia* (Müller et Troschel, 1842)      줄딱지거미불가사리  
°34. *Ophionereis eurybrachioplax* H.L. Clark, 1911      둥근딱지거미불가사리 (신칭)
- Family Ophiuridae Lyman, 1865      빗살거미불가사리 과  
Subfamily Opholepidinae Matsumoto, 1915      비늘거미불가사리 아과  
Genus *Ophiopenia* H.L. Clark, 1911      패니아거미불가사리 속
35. *Ophiopenia disacantha* H.L. Clark, 1911      민가시거미불가사리
- Genus *Ophioplocus* Lyman, 1861      곱슬거미불가사리 속
36. *Ophioplocus japonicus* H.L. Clark, 1911      왜곱슬거미불가사리
- Subfamily Ophiurinae Lyman, 1865      빗살거미불가사리 아과  
Genus *Ophiura* Lamarck, 1801      빗살거미불가사리 속
37. *Ophiura kinbergi* (Ljungman, 1866)      빗살거미불가사리  
38. *Ophiura sarsii* Lütken, 1854      살시빗살거미불가사리  
39. *Ophiura leptoctenia* H.L. Clark, 1911      가는빗살거미불가사리
- Genus *Stegophiura* Matsumoto, 1915      지붕거미불가사리 속

40. *Stegophiura sterea* H.L. Clark, 1908 지붕거미불가사리  
 41. *Stegophiura sladeni* (Duncan, 1879) 슬라덴거미불가사리

## Description of Species

1. *Gorgonocephalus eucnemis japonicus* Döderlein, 1902 삼천발이

Material examined: Mip'o, July 22, 1986, 1 specimen; Nov. 18, 1990, 1 specimen.

Distribution: Korea (Korea Strait), Japan (Honsyu, Hokkaido), Sachalin, Kurile Islands, Arctic Ocean, Alaska, San Francisco.

2. *Gorgonocephalus tuberosus* Döderlein, 1911 흑삼천발이

Material examined: Mip'o, June 5, 1983, 1 specimen; Jan. 12, 1990, 1 specimen.

Distribution: Korea (Korea Strait), Japan (Sagami Bay).

3. *Astrocladus sagaminum* (Döderlein, 1902) 나무거미불가사리

Material examined: Mip'o, July 22, 1986, 1 specimen; Jan. 12, 1990, 1 specimen.

Distribution: Korea (Korea Strait), Japan (Honsyu, Kyusyu).

4. *Astrocladus confertus confertus* Döderlein, 1902 흑가지거미불가사리

Material examined: Pangöjin, July 22, 1963, 1 specimen; Indaedo, July 10, 1964, 1 specimen; Kun-nae 6-10m, June 22, 1986, 1 specimen; Doch'öng, Apr. 29, 1990, 5 specimens.

Distribution: Korea (Sea of Japan, Korea Strait, Cheju Island), Japan (Southern Honsyu, Kyusyu), Peter the Great Bay, East China Sea, Philippines, Indo-Pacific Ocean.

5. *Astrocladus confertus pardalis* (Döderlein, 1902) 표범흑가지불가사리

Material examined: Mip'o, Nov. 18, 1990, 1 specimen; Doch'öng, Apr. 29, 1990, 1 specimen.

Distribution: Korea (Korea Strait), Japan (Honsyu, Kyusyu), Peter the Great Bay, East China Sea.

6. *Astrocladus confertus dofeini* Döderlein, 1910 도플라인흑가지거미불가사리

Material examined: Mip'o, Nov. 18, 1990, 2 specimens; Doch'öng, Apr. 9, 1990, 5 specimens.

Distribution: Korea (Korea Strait, Cheju Island), Japan (Southern Honsyu, Kyusyu), Peter the Great Bay, Philippines, Vladivostok.

7. *Astrocladus annulatus* (Matsumoto, 1912) 띠가지거미불가사리

Material examined: Mip'o, July 22, 1986, 2 specimens.

Distribution: Korea (Sea of Japan, Korea Strait), Japan (Misaki, Sagami Bay).

8. *Ophiocantha omoplata* H.L. Clark, 1911 넓적침거미불가사리

Material examined: Ch'uksan, Apr. 25, 1976, 3 specimens; Kuryongp'o, July 12, 1984, 1 specimen.

Distribution: Korea (Sea of Japan), Japan (Sea of Japan), East China Sea.

\*9. *Ophiactis brachygenys* H.L. Clark, 1911 짧은뱀이거미불가사리 (Pl. 1, Figs. 1-5)

*Ophiactis brachygenys* H.L. Clark, 1911 (p. 135, fig. 51); 1915 (p. 260); Matsumoto, 1917 (p. 154); Downey, 1969 (p. 84); Irimura, 1990 (p. 80).

Material examined: Mip'o, June 5, 1983, 1 specimen; July 22, 1986, 1 specimen.

Description: R=25mm, r=5mm. Disk large and covered with small scales bearing no spine but centrodorsal plate conspicuous. Five arms present. Radial shield long, narrow and usually covered with two or three scales. Genital slit wide and clear. Oral shield rhomboid and its width far wider than its length. Adoral plate large but dorsal side and ventral side of that do not contact at proximal portion of arm. Dorsal arm plate fan shape, its width wider than its length and not contact with each other. Ventral arm plate pentagon, its width much wider than its length and not in contact with each other. Three arm spines present and upper one largest. One tentacle scale present, large and elliptical. Color scarlet in life.

Distribution: Korea (Korea Strait), Japan (Bungo Strait, Sagami Sea, Himuga).

10. *Ophiactis profundis* Lütken et Mortensen 1899 깊은뱀이거미불가사리

Material examined: Mip'o, Dec. 9, 1974, 1 specimen; Apr. 27, 1978, 2 specimens; May 15, 1980, 2 specimens; June 5, 1983, 93 specimens; Dec. 27, 1983, 1 specimen; Dec. 28, 1986, 1 specimen; Kijang, Jan. 28, 1988, 1 specimen.

Distribution: Korea (Korea Strait, Cheju Island), Japan (Honsyu, Kyusyu), Malaysian Water, Gulf of Panama, Malpelo Islands.

11. *Ophiactis affinis* Duncan, 1879 유사뱀이거미불가사리

Material examined: Changsŭngp'o, Aug. 4, 1973, 1 specimen; Mip'o, Nov. 26, 1978, 1 specimen; Chinhae, Oct. 8, 1980, 1 specimen; Narodo, July 23, 1982, 1 specimen; Singŭm, July 22, 1990, 1 specimen; Naepal, July 23, 1990, 20 specimens; Kusŏng, Oct. 5, 1990, 1 specimen; Öran, Oct. 5, 1990, 1 specimen.

Distribution: Korea (Korea Strait, Cheju Island, Yellow Sea), Japan (Kyusyu), China, Phillipine Sea, Malaysian Water, Banda Sea, Indo Pacific Ocean.

12. *Ophiactis macrolepidota* Marktanner-Turnerestscher, 1887 예쁜뱀이거미불가사리

Material examined: Mip'o, Apr. 27, 1978, 1 specimen; Apr. 29, 1978, 1 specimen; May 25, 1980, 1 specimen; Nov. 27, 1983, 1 specimen.

Distribution: Korea (Korea Strait, Yellow Sea), Japan (Honsyu, Kyusyu), New South Wales, Palao, Amboina, Sydney, Indo Pacific Ocean.

\*13. *Ophiactis modesta* Brock, 1888 잔잔뱀이거미불가사리 (Pl. 1, Figs. 6-10)

*Ophiactis modesta* Brock, 1888 (p. 482); Koehler, 1898 (p. 118, pl. 15, figs. 5-6); H.L. Clark, 1915 (p. 266); 1921 (p. 108); 1946 (p. 211); Matsumoto, 1917 (p. 156, fig. 38); Ely, 1942 (p. 40); Murakami, 1943 (p. 167); 1963a (p. 173); 1963b (p. 14, pl. 1, fig. 33, pl. 4, figs. 39, 40); 1944 (p. 264); A.M. Clark, 1949 (p. 33); 1980a (p. 487); 1980b (p. 548); Irimura, 1969 (p. 40); 1981 (p. 22); A.M. Clark & Rowe, 1971 (p. 82); A.M. Clark & Courtman-Stock, 1976 (p. 163); Liao, 1978 (p. 72).

Material examined: Sangju, Nov. 22, 1980, 1 specimen.

Description: R=15mm, r=3.2mm. Disk covered with scale and small spines located at margin of



disk. Radial shield usually divided by two scales inwards, its length three times as long as its width and its outer margin attached to each other. Interbrachial area either present or absent. Oral shield triangle like adoral plate. One oral papillae present, its width wide and large. Width of dorsal arm plate almost three times larger than its length, inner and outer margin attached to each other. Arm spine conical, five in number at proximal part of arm and the second and third spines from top longer than length of an arm joint. A round tentacle scale present and its length equal to about half of ventral arm plate. Color dark green in alcohol, dark and light color seen on arm alternatively.

Distribution: Korea (Korea Strait), Japan (Kyusyu), Xisha Island, Hawaii, Palao, Torres Strait, Ambonia, Australia, South Pacific, Southern Africa.

14. *Ophiopholis mirabilis* (Duncan, 1879) 뿔거미불가사리

Material examined: Pangjukp'o, Apr. 14, 1969, 1 specimen; Kuryongp'o, July 30, 1972, 1 specimen; Kamp'o, Aug. 1, 1972, 1 specimen; Mip'o, May 12, 1974, 1 specimen; Dec. 29, 1974, 1 specimen; Apr. 25, 1975, 4 specimens; Apr. 17, 1976, 4 specimens; Ch'uksan, Apr. 24, 1976, 3 specimens; Mip'o, Nov. 5, 1976, 200 specimens; Dec. 6, 1978, 20 specimens; Ch'ongsa, June 5, 1978, 20 specimens; Mip'o, May 15, 1980, 80 specimens; Mijo, Aug. 1, 1980, 1 specimen; Mip'o, Aug. 2, 1980, 27 specimens; Sangju, Aug. 27, 1980, 2 specimens; May 23, 1981, 1 specimen; May 24, 1981, 2 specimens; Doch'ong, July 25, 1981, 6 specimens; Sangju, Nov. 22, 1981, 1 specimen; Mip'o, Dec. 8, 1981, 130 specimens; May 23, 1982, 9 specimens; June 5, 1983, 60 specimens; Sangju, July 13, 1983, 91 specimens; Sorido, Aug. 6, 1983, 17 specimens; Kūmodo, Aug. 7, 1983, 2 specimens; Mip'o, Nov. 26, 1983, 3 specimens; June 12, 1984, 10 specimens; Samchūnp'o, July 21, 1984, 5 specimens; Yokjido, July 19, 1984, 6 specimens; Mip'o, June 22, 1985, 3 specimens; July 22, 1985, 14 specimens; Dec. 28, 1985, 2 specimens; Kijang, Jan. 28, 1988, 6 specimens; Kōmundo, July 24, 1988, 1 specimen; Mip'o, Jan. 12, 1990, 5 specimens; Wolrae, Aug. 7, 1990, 4 specimens; Yōndo, Aug. 7, 1990, 35 specimens; Mip'o, Feb. 14, 1991, 7 specimens; Kuryongp'o, Oct. 20, 1991, 8 specimens; Hajōng, Oct. 20, 1991, 3 specimens; Mop'o, Oct. 20, 1991, 2 specimens; Kamp'o, Oct. 20, 1991, 2 specimens.

Distribution: Korea (Sea of Japan, Korea Strait, Ch'aju Island, Yellow Sea), Japan (Kyusyu, Hokkaido), Okhotsk Sea, East China Sea.

15. *Ophiopholis aculeata* (Linné, 1767) 뿔족뿔거미불가사리

Material examined: Ch'uksan, Dec. 25, 1976, 1 specimen; Chukpyōn, Sep. 20, 1980, 1 specimen; Kōjin, Nov. 22, 1980, 1 specimen; Changho, Aug. 7, 1983, 4 specimens; Chumunjin, May 16, 1987, 3 specimens.

Distribution: Korea (Sea of Japan), Japan, Okhotsk Sea, Bering Sea, Arctic Sea, Alaska, California, Greenland, North Atlantic Ocean.

16. *Ophiopholis japonica* Lyman, 1879 왜뿔거미불가사리

Material examined: Ch'uksan, Apr. 24, 1976, 15 specimens; Sangju, Nov. 20, 1980, 15 specimens; Sokch'o, Oct. 3, 1990, 3 specimens; Taep'o, Aug. 11, 1991, 22 specimens; Oho, Aug. 12, 1991, 3 specimens; Sokch'o, Aug. 13, 1991, 4 specimens; Kisamun, Aug. 14, 1991, 3 specimens; Taep'o, Oct. 15, 1991, 5 specimens; Sachōn, Oct. 16, 1991, 1 specimen; Imwon, Oct. 17, 1991, 18 specimens; Chuk-

pyŏn, Oct. 18, 1991, 11 specimens; Hyunrae, Oct. 18, 1991, 1 specimen; Osan, Oct. 18, 1991, 8 specimens; Hup'o, Oct. 19, 1991, 7 specimens; Pangŏ, Oct. 19, 1991, 3 specimens.

**Distribution:** Korea (Sea of Japan, Korea Strait), Japan, Okhotsk Sea, Bering Sea, Alaska, Kamchatka, Yezo Strait.

\*17. *Ophiopholis brachyactis* H.L. Clark, 1911 완뿔거미불가사리 (Pl. 2, Figs. 1-6)

*Ophiopholis brachyactis* H.L. Clark, 1911 (p. 117, fig. 44); 1915 (p. 267); Matsumoto, 1917 (p. 163, fig. 42); Murakami, 1942 (p. 9); 1963a (p. 174); 1963b (p. 14, pl. 1, fig. 37, pl. 4, figs. 43, 44); A.M. Clark, 1965 (p. 66); Irimura, 1968 (p. 33); 1981 (p. 23); 1982 (p. 31, text-fig. 19); 1990 (p. 82).

**Material examined:** Mip'o, Dec. 29, 1974, 1 specimen; June 5, 1983, 2 specimens; Jan. 12, 1990, 9 specimens; Feb. 14, 1991, 2 specimens.

**Description:** R=55mm, r=11mm. Disk covered with scales surrounded by granules. On margin of interradius, granules with thorn end protrude. Radial shield distinctive and its length slightly longer than its width. Interbranchial area covered with many short spines. Genital slit and genital scale large. Oral shield broad in width. Adoral plate rectangle and its length short but its width long. Dorsal arm plate fan shape, its outer margin surrounded by granules in a row and at proximal part of arm its width about three times longer than its length. Oral papillae long, slender and four to six in number but tooth and dental papillae many. Lateral arm plates not meeting on dorsal side and ventral side of arm. Ventral arm plate rectangle and its width about two times longer than its length. Arm spines seven in number and median one longest among them. Large tentacle pore and one tentacle scale present. Color yellow in alcohol.

**Distribution:** Korea (Korea Strait, Cheju Island), Japan (Honsyu, Kyusyu), East China Sea.

18. *Amphiodia craterodonta* H.L. Clark, 1911 둥글거미불가사리

**Material examined:** Ch'uksan, Dec. 24, 1977, 7 specimens; Kōjin, Aug. 15, 1980, 13 specimens; Sangju, Nov. 20, 1980, 5 specimens; Kōjin, Nov. 22, 1980, 30 specimens; Kuryongp'o, Nov. 25, 1983, 11 specimens; Taep'o, Aug. 11, 1991, 12 specimens; Sokch'o, Aug. 13, 1991, 14 specimens; Chumunjin, Oct. 16, 1991, 31 specimens; Imwon, Oct. 17, 1991, 18 specimens; Chukpyŏn, Oct. 18, 1991, 11 specimens; Osan, Oct. 18, 1991, 8 specimens; Kanggu, Oct. 19, 1991, 7 specimens; Ch'angp'o, Oct. 19, 1991, 3 specimens.

**Distribution:** Korea (Sea of Japan, Korea Strait), Japan, Yezo Strait, Gulf of Taltary, Okhotsk Sea, Kamchatka, Bering Sea, Arctic Ocean.

\*19. *Amphiodia cyclaspis* D'yakonov, 1935 양편거미불가사리 (Pl. 2, Figs. 7-12)

*Amphiodia cyclaspis*: D'yakonov, 1934 (p. fig 16).

**Material examined:** Ch'uksan, Dec. 24, 1977, 2 specimens; Kōjin, Aug. 15, 1980, 5 specimens.

**Description:** R=22mm, r=5mm. Disk folded with small scales and centrodorsal plate not distinctive. Radial shield small, round, broadly separated from each other and its width somewhat broader than its length. Interbranchial area also covered with scale but its scale smaller than scale of disk. Oral shield small, rhomboid and its inner margin longer than its outer one. Adoral plate triangle, about two times larger than oral shield and in contact with each other. Margin of adoral plate connecting oral plate much concave and more protrusive as compared to oral plate. Oral papillae round, three in number, slightly elevated as com-

pared to oral plate and outer one larger than the other. Dorsal arm plate in contact with each other, divided into small plates which irregular and three to five in number on the second and third of arm joints. Remaining dorsal arm plates round triangle whose outer margin convex, its width about twice long as its length and broad as an arm joint. Ventral arm plate pentagon whose width longer than its length and in contact with each other. Arm spine three in number, lower one longest and a little bit longer than an arm joint. Tentacle scale two in number. Color dark brown in alcohol.

Distribution: Korea (Sea of Japan), Japan (Shiauka Bay), Peter the Great Bay, Moneron Island, Gulf of Taltary.

20. *Amphipholis squamata* (Delle Chiaje, 1828) 양비늘거미불가사리

Material examined: Mip'o, May 15, 1980, 1 specimen; July 22, 1986, 2 specimens; Kijang, Jan. 28, 1988, 1 specimen.

Distribution: Korea (Korea Strait, Cheju Island), Japan, Arctic Sea, Indo-West Pacific Ocean, Atlantic Ocean, Cosmopolitan.

21. *Amphipholis sobrina* Matsumoto, 1917 납작양비늘거미불가사리

Material examined: Hongdo, July 20, 1978, 1 specimen.

Distribution: Korea (Korea Strait), Japan (Honsyu).

22. *Amphipholis tetracantha* Matsumoto, 1941 네가시양비늘거미불가사리

Material examined: Ch'uksan, Aug. 15, 1980, 2 specimens.

Distribution: Korea (Sea of Japan), Japan (Honsyu).

23. *Amphipholis kochii* Lütken, 1872 코치양비늘거미불가사리 (Pl. 3, Figs. 6-10)

*Amphipholis kochii* Lütken, 1872 (p. 10, pls. 1, 2, fig. 5); Verrill, 1899 (p. 312); H.L. Clark, 1915 (p. 241); Matsumoto, 1917 (p. 192, fig. 52); 1941 (p. 338); Koehler, 1922 (p. 163); Murakami, 1942 (p. 10); 1944 (p. 265); 1963b (p. 18, pl. 1, fig. 47, pl. 5, figs. 17, 18); D'yakonov, 1954 (p. 59, fig. 19); Fell, 1962 (p. 13); Irimura, 1969 (p. 41); 1979 (p. 3).

*Amphiura kochii*: Lyman, 1882 (p. 146).

Material examined: Changho, Aug. 7, 1983, 5 specimens; Samchök, Aug. 8, 1983, 3 specimens; Taejin, June 29, 1988, 1 specimen.

Description: R=27-36mm, r=4.1-5.8mm. Disk very convex at interradius but constricted at proximal portion of arm and dorsocentral plate distinctive. Arm long and slender. Radial shield small, its length about two and a half times as long as its width and separated by a row of scales except proximal part of arm. Genital slit large. Oral shield rhomboid, its inner margin longer than its outer one and also its length slightly longer than its width. Adoral plate triangle and in contact with each other inwards. Oral papillae three in number and outer one longest, widest and arisen from adoral plate. Dorsal arm plate triangle, separated from each other, its width about two and a half times longer than its length and nearly as long as an arm joint. Ventral arm plate pentagon, slightly in contact with each other and its width longer than its length and median part of outer margin somewhat concave. Arm spine three in number and length of spine nearly longer than an arm joint. Two tentacle scale present and adradial one round, much larger than radial one

and in contact with margin of ventral arm plate. Color dark brown in alcohol.

Distribution: Korea (Sea of Japan), Japan (Sado Island, Kyusyu), Peter the Great Bay, Poseta Bay, Taltary Strait.

24. *Amphioplus tricoides* Matsumoto, 1917    덧니거미불가사리

Material examined: Gamagyang, 1980, 8 specimens; Maryang, July 5, 1990, 2 specimens.

Distribution: Korea (Korea Strait), Japan.

25. *Amphioplus japonicus parvus* Matsumoto, 1941    순양거미불가사리

Material examined: Gamagyang, 1980, 2 specimens; Chinhae, Oct. 8, 1980, 4 specimens.

Distribution: Korea (Korea Strait, Yellow Sea), Japan (Honsyu, Kyusyu), Siam Bay, Kei Peninsula.

26. *Amphiura koreae* Duncan, 1879    턱뱀거미불가사리

Material examined: Mip'o, May 14, 1980, 1 specimen; May 15, 1980, 4 specimens; Aug. 3, 1980, 1 specimen; Doch'ong, July 26, 1981, 2 specimens; Mip'o June 5, 1983, 10 specimens; Nov. 27, 1983, 2 specimens; July 22, 1986, 4 specimens; Wolrae, Aug. 7, 1990, 1 specimen.

Distribution: Korea (Korea Strait, Cheju Island), Japan, China, Philippines, Indo-West Pacific Ocean, Madagascar, California, Central America.

27. *Amphiura aestuarii* Matsumoto, 1915    아기팔거미불가사리

Material examined: Mangnam, June 22, 1986, 6 specimens; Doch'ong, Apr. 28, 1990, 2 specimens.

Distribution: Korea (Korea Strait, Yellow Sea), Japan.

28. *Amphiura sinicola* (Matsumoto, 1941)    긴팔거미불가사리

Material examined: Pibong, Oct. 15, 1980, 3 specimens; Kagyo, July 6, 1986, 1 specimen; Dungsan, Apr. 25, 1990, 2 specimens; Kunnae, June 22, 1990, 1 specimen; Maryang, July 5, 1990, 4 specimens; Ōran, Oct. 6, 1990, 8 specimens; June 27, 1991, 5 specimens; Tongho, June 7, 1991, 3 specimens; Kwanmog, June 7, 1991, 3 specimens.

Distribution: Korea (Korea Strait, Yellow Sea), Japan.

29. *Ophiothrix koreana* Duncan, 1879    고려가시거미불가사리

Material examined: Mip'o, Apr. 27, 1978, 1 specimen; Dec. 6, 1978, 1 specimen.

Distribution: Korea (Korea Strait, Cheju Island), Japan, East China Sea, Philippines, Amboina, Banda Sea.

30. *Ophiothrix exigua* (Lyman, 1874)    짧은가시거미불가사리

Material examined: Mip'o, May 14, 1980, 1 specimen; May 15, 1980, 1 specimen; Mijo, July 31, 1980, 6 specimens; Sangju, Aug. 27, 1980, 1 specimen; Mip'o, Aug. 2, 1980, 4 specimens; Sangju, Nov. 15, 1980, 1 specimen; Nov. 22, 1980, 1 specimen; May 24, 1981, 15 specimens; Doch'ong, July 25, 1981, 2 specimens; July 26, 1981, 4 specimens; Mip'o, Dec. 8, 1981, 1 specimen; Nohwado, July 21, 1981, 1 specimen; Mip'o, May 23, 1982, 4 specimens; Narodo, July 23, 1982, 5 specimens; Kūmodo, Aug. 5,

1983, 3 specimens; Mip'o, June 5, 1983, 25 specimens; Pangjukp'o, June 27, 1983, 10 specimens; Sangju, July 13, 1973, 12 specimens; Pijindo, Sep. 18, 1983, 1 specimen; Kuryongp'o, Nov. 5, 1983, 2 specimens; Mip'o, Nov. 26, 1983, 1 specimen; Ch'ungmu, July 22, 1984, 1 specimen; Pijindo, July 22, 1984, 2 specimens; Samchŭnp'o, July 21, 1984, 39 specimens; Sinsudo, July 21, 1984, 2 specimens; Nŭkdo, July 22, 1984, 4 specimens; Kŭndŏk, Aug. 7, 1985, 1 specimen; Mip'o, June 22, 1985, 4 specimens; Wondong, June 21, 1986, 2 specimens; Mandŏk, June 22, 1986, 1 specimen; Mangnam, June 22, 1986, 1 specimen; Dŭngsan, Apr. 25, 1990, 3 specimens; Sŏnchang, Apr. 26, 1990, 3 specimens; Pija, Apr. 26, 1990, 1 specimen; Kunnae, Apr. 28, 1990, 3 specimens; Doch'ŏng, Apr. 29, 1990, 4 specimens; Sinhŭng, Apr. 29, 1990, 3 specimens; Apr. 25, 1990, 3 specimens; Maryang, July 5, 1990, 8 specimens; Kago, July 5, 1990, 4 specimens; Nokdong, July 21, 1990, 2 specimens; Singŭm, July 22, 1990, 11 specimens; P'ungnab, July 22, 1990, 1 specimen; Naepal, July 23, 1990, 1 specimen; Kunnae (Dolsando), Aug. 6, 1990, 1 specimen; Yŏndo, Aug. 6, 1990, 12 specimens; Kyedong, Aug. 7, 1990, 2 specimens; Wonp'o, Aug. 7, 1990, 2 specimens; Wolrae, Aug. 7, 1990, 35 specimens; Mulkŏn, Aug. 19, 1990, 1 specimen; Sŏsang, Aug. 20, 1990, 3 specimens; Dangjŏ, Aug. 20, 1990, 2 specimens; Kahag, Sep. 19, 1990, 3 specimens; Gulp'o, Sep. 19, 1990, 3 specimens; Sep. 20, 1990, 6 specimens; Chugrim, Sep. 20, 1990, 15 specimens; Kusŏng, June 26, 1991, 15 specimens; Changho, Oct. 18, 1991, 3 specimens; Yangp'o, Oct. 20, 1991, 2 specimens.

Distribution: Korea (Sea of Japan, Korea Strait, Cheju Island, Yellow Sea), Japan, China, Hongkong, Amboina, Indo-West Pacific Ocean.

### 31. *Ophiogymna fulgens* (Koehler, 1905) 큰뱀가시거미불가사리

Material examined: Mijo, Feb. 30, 1980, 2 specimens; Mip'o, May 15, 1980, 10 specimens; Mijo, July 31, 1980, 2 specimens; Aug. 3, 1980, 25 specimens; Mip'o, May 23, 1982, 4 specimens; June 5, 1983, 20 specimens; Nov. 27, 1983, 1 specimen; Todong, July 11, 1984, 1 specimen; Mip'o, July 22, 1986, 6 specimens.

Distribution: Korea (Korea Strait, Cheju Island), Japan, China, East China Sea, Philippines, East Indies, Indo Pacific Ocean.

### 32. *Ophiarachnella gorgonia* Müller et Troschel, 1842 뱀거미불가사리

Material examined: Kuryongp'o, July 30, 1972, 1 specimen; Pangŏjin, Aug. 2, 1972, 3 specimens; Mip'o, Apr. 16, 1976, 2 specimens; Apr. 17, 1976, 4 specimens; May 24, 1980, 15 specimens; Aug. 3, 1980, 3 specimens; Sangju, July 21, 1981, 3 specimens; Mip'o, Dec. 10, 1981, 23 specimens; Aug. 3, 1982, 1 specimen; May 23, 1983, 2 specimens; Sangju, July 13, 1983, 1 specimen; Mip'o, Nov. 27, 1983, 50 specimens; Samchŭnp'o, July 20, 1984, 1 specimen; Mip'o, June 20, 1984, 1 specimen; Kŏmundo, June 24, 1988, 3 specimens; June 25, 1988, 12 specimens; Mip'o, Jan. 12, 1990, 5 specimens; Mip'o, Oct. 20, 1991, 1 specimen; Yangp'o, Oct. 20, 1991, 1 specimen.

Distribution: Korea (Sea of Japan, Korea Strait, Cheju Island), Japan, Philippines, Indo-West Pacific Ocean, North Australia, Madagascar, Africa.

### 33. *Ophionereis dubia* (Müller et Troschel, 1842) 줄막지거미불가사리

Material examined: Kuryongp'o, Nov. 5, 1983, 1 specimen.

Distribution: Korea (Korea Strait, Cheju Island), Japan, China, Hongkong, Indo-West Pacific Ocean.

34. *Ophionereis eurybrachioplax* H.L. Clark, 1911 둥근딱지거미불가사리 (Pl. 3, Figs. 1-5)

*Ophionereis eurybrachioplax* H.L. Clark, 1911 (p. 173, figs. 7, 8); 1915 (p. 289); Matsumoto, 1917 (p. 336); Matsumoto et al., 1918 (p. 479, fig. 2); May, 1924 (p. 298, fig. 16); Downey, 1969 (p. 163); Irimura, 1982 (p. 72, Text-fig. 44).

Material examined: Sorido, Aug. 6, 1983, 4 specimens; Pijindo, July 19, 1984, 1 specimen.

Description: R=84-110mm, r=14-16mm. Disk folded with a very small scale but scale around radial shield somewhat large. Radial shield very small, separated farther and its length about twice large as its width. Interbranchial area covered with very small scale. Genital slit small. Oral shield round triangle and its length somewhat longer than its width. Adoral plate small and not in contact with each other. Oral papillae four or five in number and second one from outside widest. Dorsal arm plate hexagon, so wide that its width more than two times longer than its length, also those connect broadly each other and one small additional plate present in both sides respectively. Arm spine four in number at proximal portion of arm and somewhat longer and thicker than an arm joint. One tentacle scale round and large. Color brown-tinted gray in alcohol, dark colored stripe observed on disk and irregular dark colored band also observed on arm.

Distribution: Korea (Korea Strait), Japan, California, Monterey Bay.

35. *Ophiopenia disacantha* H.L. Clark, 1911 민가시거미불가사리

Material examined: Ch'uksan, Dec. 24, 1976, 1 specimen; Sokch'o, Oct. 3, 1990, 1 specimen.

Distribution: Korea (Sea of Japan), Japan, Bering sea, Alaska, North Pacific Ocean.

36. *Ophiotropus japonicus* H.L. Clark, 1911 왜곱슬거미불가사리

Material examined: Kuryongp'o, July 30, 1972, 3 specimens; Pangöjin, Aug. 2, 1972, 1 specimen; Mip'o, Apr. 25, 1975, 1 specimen; Apr. 17, 1976, 1 specimen; Mijo, Aug. 1, 1980, 1 specimen; Sangju, May 21, 1981, 9, specimens; Mip'o, May 26, 1981, 1 specimen; Sangju, July 21, 1981, 2 specimens; Kömun-do, July 21, 1982, 4 specimens; Sangju, July 13, 1983, 6 specimens; Mip'o, Nov. 27, 1983, 1 specimen; Sinhüing, Apr. 25, 1990, 12 specimens; Döngsan, Apr. 25, 1990, 2 specimens; Sönnchang, Apr. 25, 1990, 2 specimens; Yesong, Apr. 26, 1990, 1 specimen; Pija, Apr. 26, 1990, 1 specimen; Kunnae, Apr. 28, 1990, 2 specimens; Doch'öng, Apr. 28, 1990, 1 specimen; Chugrim, Sep. 20, 1990, 3 specimens.

Distribution: Korea (Sea of Japan, Korea Strait, Cheju Island), Japan (Honsyu, Kyusyu).

37. *Ophiura kinbergi* (Ljungman, 1866) 빗살거미불가사리

Material examined: Pibong, Oct. 15, 1980, 1 specimen; Garolim Bay, Nov. 1, 1980, 8 specimens; Sangju, May 20, 1981, 1 specimen; Pangjukp'o, July 9, 1981, 1 specimen; Kunnae (Dolsando) 6-10m, June 22, 1986, 4 specimens; Sangju, Apr. 27, 1990, 2 specimens; Nokdong, June 21, 1990, 5 specimens; Singüim, June 22, 1990, 5 specimens; Kunnae (Dolsando), Aug. 6, 1990, 3 specimens; Wolrae, Aug. 7, 1990, 8 specimens.

Distribution: Korea (Korea Strait, Yellow Sea), Japan, China, Red Sea, Indo-West Pacific Ocean.

38. *Ophiura sarsii* Lütken, 1854 살시빗살거미불가사리

**Material examined:** Kuryongp'o, July 30, 1972, 25 specimens; Todong, July 23, 1976, 3 specimens; Mip'o, Nov. 5, 1976, 5 specimens; May 16, 1980, 3 specimens; Kōjin, Aug. 15, 1980, 3 specimens; Chukpyōn, Sep. 20, 1980, 19 specimens; Kōjin, Nov. 20, 1980, 6 specimens; Sangju, Nov. 20, 1980, 45 specimens; Ch'ungmu, Aug. 2, 1982, 1 specimen; Samchōk, Aug. 4, 1983, 11 specimens; Aug. 5, 1983, 1 specimen; Kōjin, Aug. 15, 1983, 6 specimens; Kuryongp'o, Nov. 2, 1983, 30 specimens; P'ohang, Nov. 24, 1983, 2 specimens; Kuryongp'o, July 12, 1984; Chumunjin, May 26, 1985, 15 specimens; May 2, 1987, 5 specimens; May 16, 1987, 4 specimens; Sokch'o, June 28, 1988, 7 specimens; Kijang, Jan. 28, 1988, 3 specimens; Sokch'o, June 29, 1988, 4 specimens; Mip'o, Jan. 12, 1990, 33 specimens; Singūm, July 22, 1990, 15 specimens; Yōndo, Aug. 7, 1990, 16 specimens; Sokch'o, Oct. 3, 1990, 13 specimens; Taep'o, Aug. 11, 1991, 12 specimens; Sokch'o, Aug. 12, 1990, 15 specimens; Kajin, Aug. 12, 1991, 3 specimens; Panam, Aug. 12, 1990, 3 specimens; Cho, Aug. 12, 1991, 3 specimens; Ayajin, Aug. 12, 1991, 3 specimens; Sokch'o, Aug. 13, 1991, 14 specimens; Kisamun, Aug. 13, 1991, 1 specimen; Namae, Aug. 13, 1991, 5 specimens; Sokch'o, Aug. 14, 1991, 14 specimens; Susan, Aug. 14, 1991, 1 specimen; Taep'o, Aug. 15, 1991, 14 specimens; Sokch'o, Aug. 15, 1991, 1 specimen; Kangmun, Aug. 15, 1991, 2 specimens; Kisamun, Oct. 14, 1991, 3 specimens; Namae, Oct. 15, 1991, 5 specimens; Chumunjin, Oct. 16, 1991, 1 specimen; Okkye, Oct. 17, 1991, 2 specimens; Changho, Oct. 17, 1991, 8 specimens; Imwon, Oct. 17, 1991, 6 specimens; Chukpyōn, Oct. 18, 1991, 3 specimens; Ch'ahyu, Oct. 19, 1991, 3 specimens; Osan, Oct. 18, 1991, 4 specimens; Hup'o, Oct. 19, 1991, 5 specimens; Kanggu, Oct. 19, 1991, 3 specimens; Ch'angp'o, Oct. 19, 1991, 3 specimens; Kuryongp'o, Oct. 20, 1991, 8 specimens; Hajōng, Oct. 20, 1991, 3 specimens; Kamp'o, Oct. 20, 1991, 2 specimens.

**Distribution:** Korea (Sea of Japan, Korea Strait, Cheju Island, Yellow Sea), Japan, Bering Sea, Arctic Ocean, North Pacific Ocean, Greenland, North Europe, North Atlantic Ocean.

39. *Ophiura leptocentria* H.L. Clark, 1911 가는빛살거미불가사리

**Material examined:** Mukho, Aug. 7, 1971, 1 specimen; Ch'uksan, Apr. 25, 1976, 3 specimens; Kōjin, Aug. 15, 1980, 5 specimens; Nov. 22, 1980, 3 specimens; P'ohang, Nov. 24, 1983, 6 specimens; Kuryongp'o, July 12, 1984, 54 specimens; Sokch'o, June 28, 1988, 1 specimen; Oct. 3, 1990, 13 specimens; Aug. 2, 1991, 15 specimens; Kajin, Aug. 11, 1991, 10 specimens; Cho, Aug. 12, 1991, 3 specimens; Sokch'o, Aug. 13, 1991, 13 specimens; Oct. 15, 1991, 4 specimens; Sachōn, Oct. 16, 1991, 1 specimen; Imwon, Oct. 17, 1991, 20 specimens; Chukpyōn, Oct. 18, 1991, 3 specimens; Osan, Oct. 18, 1991, 8 specimens; Hup'o, Oct. 19, 1991, 7 specimens; Kanggu, Oct. 19, 1991, 3 specimens; Ch'angp'o, Oct. 19, 1991, 11 specimens.

**Distribution:** Korea (Sea of Japan), Japan (Honsyu, Hokkaido), Okhotsk, Bering sea.

40. *Stegophiura sterea* H.L. Clark, 1908 지붕거미불가사리

**Material examined:** Ch'uksan, Apr. 24, 1976, 1 specimen; Mip'o, May 16, 1983, 8 specimens.

**Distribution:** Korea (Sea of Japan, Korea Strait), Japan.

41. *Stegophiura sladeni* (Duncan, 1879) 슬라덴거미불가사리

**Material examined:** Mip'o, Jan. 12, 1983, 4 specimens.

**Distribution:** Korea (Korea Strait), Japan, Indo-West Pacific Ocean.

### Distribution of species

The distribution pattern of species on the basis of collection localities and numbers of species and individuals collected from the Sea of Japan and the Korea Strait is as follows. Table 1 depicts the species distributed commonly between coastal areas and only in each area. As shown in table the number of species distributed in Korea Strait is 24 (58.5%) which is greatest in total 41 species while the species distributed commonly in the Sea of Japan and the Korea Strait is 9 (22.0%) and the species distributed only in the Sea of Japan is 8 (19.5%). Thus the region containing greatest number of species in each coastal areas is the Korea Strait where 33 species is collected and 16 species is collected in the Sea of Japan.

The species very commonly collected in the Sea of Japan is *Ophiura sarsii* which was found in 26 localities of total 36 localities while in the Korea Strait *Ophiothrix exigua* was collected from 35 localities of 56 localities. In both regions *Ophiothrix exigua* is most predominantly collected from 44 of total 92 localities, the next one being *Ophiura sarsii* collected in 33 localities, *Ophiopholis mirabilis* in 21 localities. The species collected in the greatest number of individual among 41 species is *Ophiopholis mirabilis* which corresponds to 802 specimens among total 2,673 specimens collected, the next being *Ophiura sarsii* with 447 specimens and *Ophiopholis exigua* with 331 specimens.

Table 1. Numbers of localities and specimens of each ophiuroid species occurred in only one or two regions.

Region	Species (%)	Number of localities	Number of specimens
Sea of Japan	<i>Ophiacantha omoplata</i>	2	4
	<i>Ophiopholis aculeata</i>	5	10
	<i>Amphiodia cyclaspis</i>	2	7
	<i>Amphipholis tetracantha</i>	1	2
	<i>Amphipholis kochii</i>	3	9
	<i>Ophiopenia disacantha</i>	1	2
	<i>Ophionereis dubia</i>	1	1
	<i>Ophiura leptoctenia</i>	14	184
Subtotal (%)	8 (19.5)		219
	<i>Gorgonocephalus eucnemis japonicus</i>	1	2
	<i>Gorgonocephalus tuberosus</i>	1	2
	<i>Astrodendrum sagaminum</i>	1	2
	<i>Astrocladus coniferus coniferus</i>	5	8
	<i>Astrocladus coniferus dofleini</i>	2	7
	<i>Astrocladus coniferus pardalis</i>	2	2
	<i>Ophiactis brachygenys</i>	1	2
	<i>Ophiactis profundus</i>	2	101



Table 1. Continue

Region	Species	Number of localities	Number of specimens
Korea Strait	<i>Ophiactis affinis</i>	8	27
	<i>Ophiactis macrolepidota</i>	1	4
	<i>Ophiactis modesta</i>	1	1
	<i>Ophiopholis brachyactis</i>	1	14
	<i>Amphipholis squamata</i>	3	5
	<i>Amphipholis sobrina</i>	1	1
	<i>Amphioplus tricoides</i>	2	10
	<i>Amphioplus japonicus parvus</i>	2	6
	<i>Amphiura koreae</i>	3	25
	<i>Amphiura aestuarii</i>	2	8
	<i>Amphiura sinicola</i>	6	30
	<i>Ophiothrix koreana</i>	2	3
	<i>Ophiogymma fulgens</i>	3	71
	<i>Ophionereis eurybrachioplax</i>	2	5
	<i>Ophiura kinbergi</i>	10	48
	<i>Stegophiura sladeni</i>	1	4
Subtotal (%)	24 (58.5)		388
Sea of Japan, Korea Strait	<i>Astrocladus annulatus</i>	1	2
	<i>Ophiopholis mirabilis</i>	18	802
	<i>Ophiopholis japonica</i>	13	119
	<i>Ophiothrix exigua</i>	44	331
	<i>Amphiodia craterodmeta</i>	12	170
	<i>Ophioplocus japonicus</i>	14	54
	<i>Ophiarachnella gorgonia</i>	8	132
	<i>Ophiura sarsii</i>	33	447
	<i>Stegophiura sterea</i>	2	9
Subtotal (%)	9 (22.0)		2,066
Total (%)	41 (100.0)		2,673

Korean ophiuroids is mainly distributed in North Pacific Ocean, Indo-West Pacific Ocean, Arctic Ocean and Atlantic Ocean. The number of species commonly found in each ocean has been examined. As shown in table 2, 41 Korean species (100.0%) was found in North Pacific Ocean which is the greatest number, the next one being 15 species (36.6%) in Indo-West Pacific Ocean, 5 species (12.2%) in Arctic Ocean and 4 species (9.8%) in Atlantic Ocean. Why all Korean ophiuroids identified is found in the greatest number

Table 2. Distribution of Korean ophiuroids according to oceanic regions and water forms.

Species	Region	Ocean								Water form			
		North Pacific					Indo-West Pacific			Tropical	Warm-Temperate	Cold-Temperate	Boreal
		Sea of Japan	Korea Strait	Japan	East China Sea	Others	Indian	West Pacific	Arctic	Atlantic			
<i>Gorgonocephalus eucnemis japonicus</i>			+	+		+			+			+	+
<i>Gorgonacephalus tuberosus</i>			+	+							+		
<i>Astrodendrum sagaminum</i>			+	+	+		+			+	+		
<i>Astrocladus coniferus coniferus</i>			+	+	+		+	+		+	+		
<i>Astrocladus coniferus dofleini</i>			+	+			+	+		+	+		
<i>Astrocladus coniferus paradalis</i>			+	+	+						+		
<i>Astrocladus annulatus</i>			+	+							+		
<i>Ophiacantha omoplata</i>		+		+								+	
<i>Ophiactis brachygenys</i>			+	+							+		
<i>Ophiactis profundus</i>			+	+				+		+	+		
<i>Ophiactis affinis</i>			+	+			+	+		+	+		
<i>Ophiactis macrolepidota</i>			+	+				+		+	+		
<i>Ophiactis modesta</i>			+	+			+	+		+	+		
<i>Ophiopholis mirabilis</i>		+	+	+							+	+	
<i>Ophiopholis aculeata</i>		+		+		+			+	+		+	+
<i>Ophiopholis japonica</i>		+	+	+		+						+	+
<i>Ophiopholis brachyactis</i>			+	+	+						+		
<i>Amphiodia craterodonta</i>		+	+	+		+			+			+	+
<i>Amphiodia cyclaspis</i>		+		+								+	
<i>Amphipholis squamata</i>			+	+	+	+	+	+	+	+	+	+	+
<i>Amphipholis sobrina</i>			+	+							+		
<i>Amphipholis tetracantha</i>		+		+							+		
<i>Amphipholis kochii</i>				+		+					+		
<i>Amphioplus tricoides</i>			+	+							+		
<i>Amphioplus japonicus parvus</i>			+	+							+		
<i>Amphiura koreae</i>			+	+	+					+	+		
<i>Amphiura aestuarii</i>			+	+	+						+	+	
<i>Amphiura sinicola</i>			+	+							+		
<i>Ophiotrix koreana</i>			+	+	+			+		+	+		
<i>Ophiotrix exigua</i>		+	+	+	+		+	+		+	+		
<i>Ophiogymma fulgens</i>		+	+	+	+			+		+	+		

Table 2. Continue

Species	Region	Ocean								Water form				
		North Pacific					Indo-West Pacific							
		Sea of Japan	Korea Strait	Japan	East China Sea	Others	Indian	West Pacific	Arctic	Atlantic	Tropical	Warm-Temperate	Cold-Temperate	Boreal
<i>Ophiarachnella gorgonia</i>		+	+	+			+	+			+	+		
<i>Ophionereis dubia</i>		+			+		+	+			+	+		
<i>Ophionereis eurybrachioplax</i>				+		+						+		
<i>Ophiopenia disacantha</i>		+			+		+						+	+
<i>Ophioplocus japonicus</i>		+	+	+								+		
<i>Ophiura kinbergi</i>			+	+	+		+	+			+	+		
<i>Ophiura sarsii</i>		+	+	+		+			+	+			+	+
<i>Ophiura leptoctenia</i>		+			+								+	+
<i>Stegophiura sterea</i>		+	+	+								+		
<i>Stegophiura sladeni</i>			+	+			+				+	+		
Total number of species		16	33	41	12	10	11	13	5	4	16	30	12	8

in North Pacific Ocean can be explained by the fact that Korea is situated in North-West Pacific Ocean. And differences in the distribution of species according to water forms is also presented in table. Fifteen species (36.6%) were found to be a tropical and warm-temperate water forms, 14 species (34.1%) to be a warm-temperate water form, 7 species (17.1%) to be a cold-temperate and boreal water forms, 2 species (4.9%) to be a warm-temperate and cold-temperate water forms, 2 species (4.9%) to be a cold-temperate water form and 1 species (2.4%) to be a cosmopolitan form. The fact that a tropical and warm-temperate water form, warm-temperate water form, cold-temperate and boreal water form species are distributed in large number strongly suggests that the Sea of Japan and the Korea Strait are greatly influenced by Kuroshio Current going up from southern part toward the North and Liman Current coming from Okhotsk Ocean toward the South. The species can be classified into tropical species, temperate species, boreal species and cosmopolitan species. Eighteen temperate species (43.9%) were found in the greatest number, the next one being tropical species with 15 species (36.6%), the third one being boreal species with 7 species (17.1%) and then 1 cosmopolitan species (2.4%) was found. The main reason why temperate species found in the greatest number can be accounted for the fact that Korea is geographically situated in the temperate zone.

### ABSTRACT

To perform the systematic study on Korean Ophiuroidea the specimens collected from

total 92 localities in the Sea of Japan and the Korea Strait during the period from April, 1969 to October, 1991 were classified. As a result, 41 ophiuroid species belonging to 18 genera, 8 families, 4 suborders and 2 orders were identified, of which 6 species, namely, *Ophiactis brachygenys*, *Ophiactis modesta*, *Ophiopholis brachyactis*, *Amphiodia cyclaspis*, *Amphipholis kochii*, *Ophionereis eurybrachioplax* have not been reported in Korea before. With regard to the distribution of species, 24 species (58.5%) were found only in the Korea Strait, 9 species (22.0%) occurred either in the Sea of Japan and the Korea Strait and 8 species (19.5%) only in the Sea of Japan. *Ophiothrix exigua* was predominantly collected from 44 localities of total 92 localities examined and also from the Korea Strait, but *Ophiura sarsii* was the commonest species in the Sea of Japan. Eighteen temperate species (43.9%) were found in the greatest number, and then 15 tropical species (36.6%), 7 boreal species (17.1%) and 1 cosmopolitan species (2.4%) were found.

#### ACKNOWLEDGEMENTS

The author would like to express her deep appreciation to Dr. Boon Jo Rho and Dr. Jun Im Song of Department of Biology, Ewha Womans University for providing a part of specimens for this work.

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RECEIVED: 3 APRIL 1992

ACCEPTED: 2 MAY 1992

## EXPLANATION OF PLATES

### Plate 1

Figs. 1-5. *Ophiactis brachygenys* H.L. Clark.

1,3, dorsal view; 2,4, ventral view; 5, lateral arm plate and arm spine. Scale size, 1cm.

Figs. 6-10. *Ophiactis modesta* Brock.

6,9, dorsal view; 7,10, ventral view; 8, lateral arm plate and arm spine. Scale size, 1cm.

### Plate 2

Figs. 1-6. *Ophiopholis brachyactis* H.L. Clark.

1,3, dorsal view; 2,4, ventral view; 5, lateral arm plate and arm spine; 6, oral shield, aboral plate, oral plate and oral papillae. Scale size, 1cm.

Figs. 7-12. *Amphiodia cyclaspis* D'yakonov.

7,10,11, dorsal view; 8,9, ventral view; 12, lateral and arm spine. Scale size, 1cm.

### Plate 3

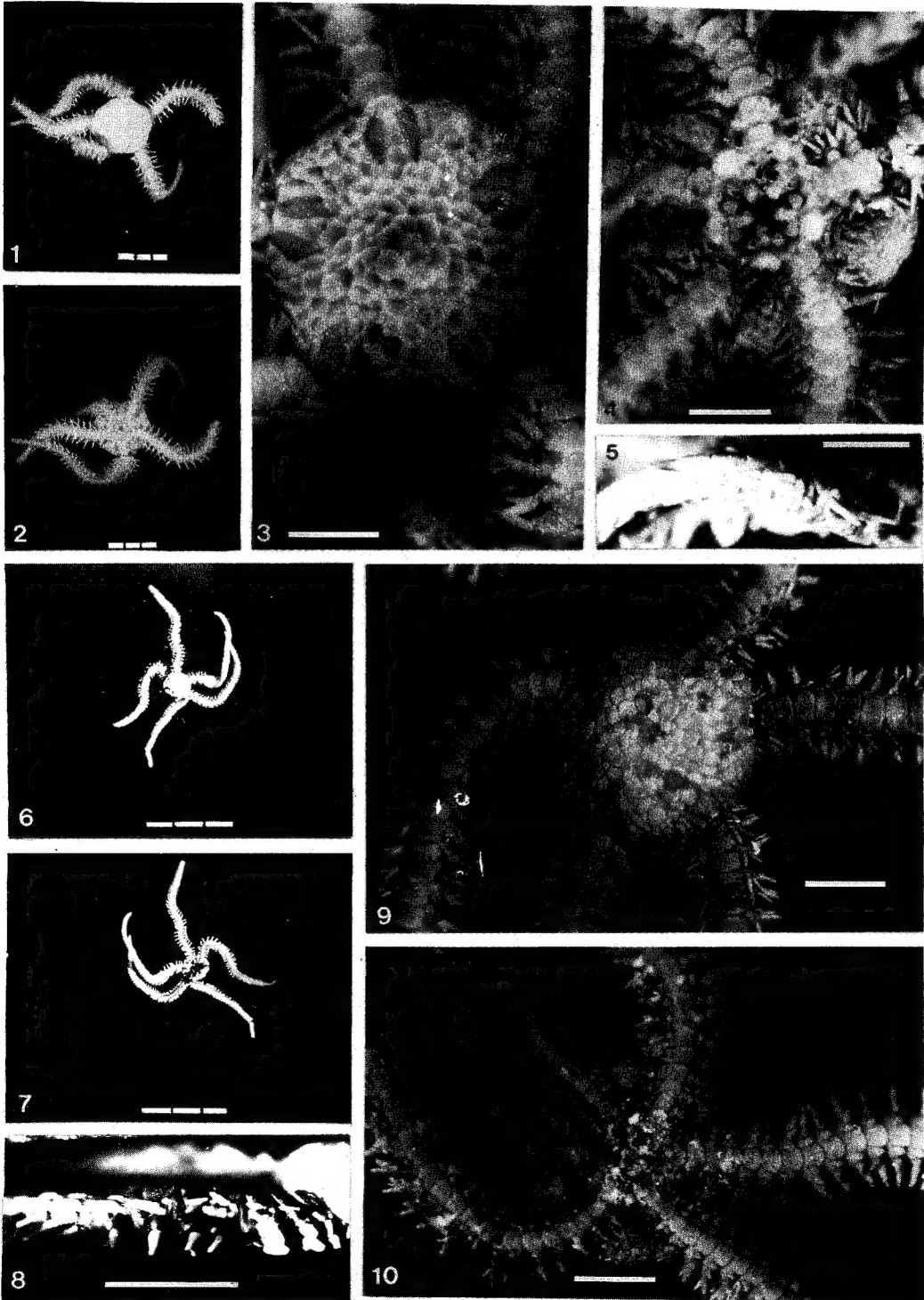
Figs. 1-5. *Ophionereis eurybrachioplax* H.L. Clark.

1,2,5, Dorsal view; 3, lateral arm plate and arm spine; 4, Ventral view. Scale size, 1cm.

Figs. 6-10. *Amphipholis kochii* Lutken.

6,9, dorsal view; 7,10, ventral view; 8, lateral arm plate and arm spine. Scale size, 1cm.

PLATE 1



## PLATE 2

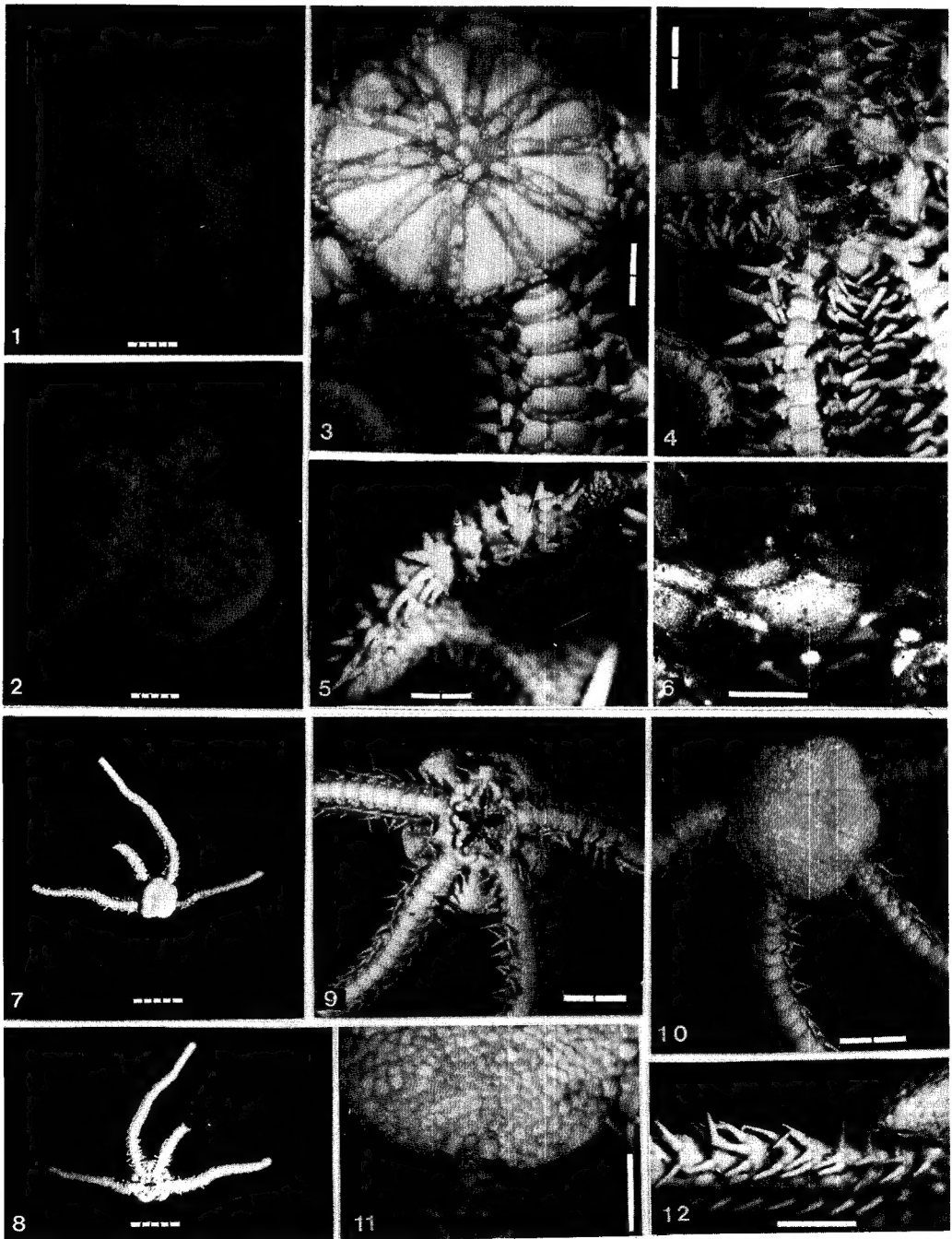




PLATE 3

